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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,912	05/27/2005	Frederick John Currell	MUR07-GN002	5670

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CINCINNATI, OH 45202-3957

EXAMINER

JOHNSTON, PHILLIP A

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2881

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02/29/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/524,912	Applicant(s) CURRELL, FREDERICK JOHN	
	Examiner PHILLIP A. JOHNSTON	Art Unit 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 16-56 and 64-96 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 16-56 and 64-96 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 May 2005 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

1. This Office Action is submitted in response to the amendment filed 11-26-2007, wherein claims 1, 16, 17, 19, 20, 45, 49, 64, 65, and 68 have been amended; claims 9-15 and 57-63 have been canceled. Claims 1-8, 16-56, and 64-96 are pending.

Response to Arguments

2. The examiner agrees with applicant's arguments regarding the 35 U.S.C. 112 rejection mailed 5-31-2007, and therefore withdraws the previous 112 rejection.

3. The arguments addressing the remaining rejections in the previous office action are missing from the faxed remarks; however, any arguments addressing the remaining arguments are moot in view of new grounds for rejection necessitated by the applicant's amendment.

Claims Rejection – 35 U.S.C. 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1 and 49 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contain subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the

invention. Particular subject matter contained in claims 1 and 49 includes the limitation "the array is substantially flush."

A review of the specification and drawings has indicated a complete absence of any description relating to an "array that is substantially flush". Although one skilled in the art of electrode configurations would recognize that a substantially flush array can have several interpretations, however the applicant's disclosure does not provide any description to support the amended claim limitation "the array is substantially flush ". In addition, paragraph [0080] of the applicant's specification indicates that, "electrodes may be in an array which is substantially planar, but in which some are at relatively raised or lowered positions." As a result it is the examiners contention that the specification does not contain clear, concise, and exact terms that would enable any person skilled in the art to make and use the now claimed invention.

Claims Rejection - 35 U.S. C. 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-8,17-22, 24-29, 41-43, 45-56, 65-70, 75-77, 80-87, 89-91, and 93-96 are rejected under 35 U.S.C. 102 (e) as being anticipated by Whitehouse, U.S. Patent No. 6,683,301.

8. Regarding claim 1, Whitehouse discloses in Figure 1A below, an apparatus having a region 10 where the phase space of a charged particle is manipulated by the electric field formed above electrode 11 (one electrode arranged on a surface). See Col. 18, line 50-67; and Col. 19, line 1-13. Both AC and DC are supplied to the electrodes in the region by power supply 400 (Col. 24, line 1-25).

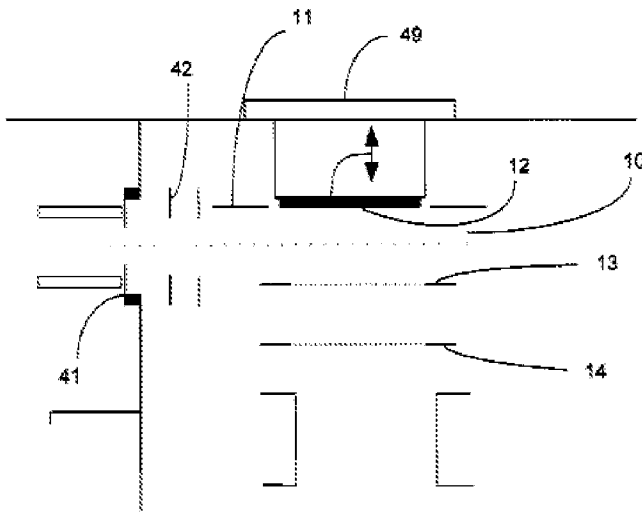


Figure 1A

Whitehouse also teaches that electrode surface 12 is an array 90 of wire tips (separate electrodes 88 each having the same height from surface 91 (Note FIG. 5A below). See also Col. 9, line 40-50; and Col. 23, line 50-65.

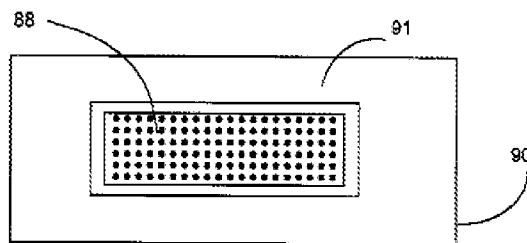


Figure 5A

Whitehouse further teaches that ions trapped in the potential well of the pulsing region, oscillate indefinitely as shown in Figure 1C, from which the examiner has interpreted that the oscillating ions move from side to side, which moving to one side of the array.

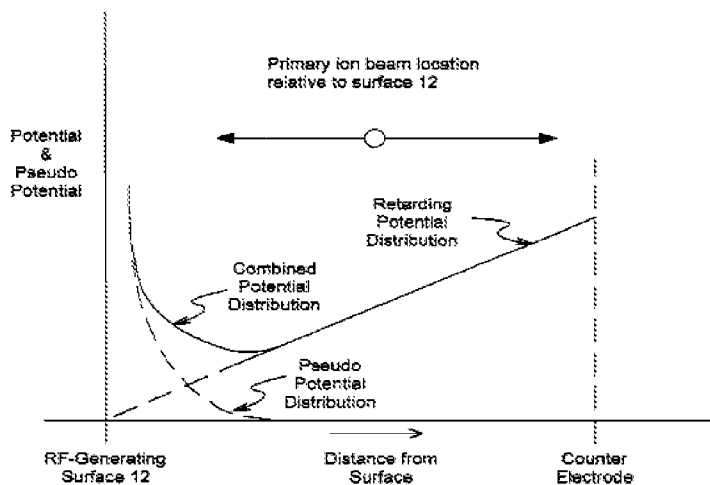


Figure 1C

9. Regarding claims 2 and 3, Whitehouse teaches that the pulsing region and Time-Of-Flight drift region have different vacuum pumping systems to maintain their required vacuum pressures. The pressure in pulsing region 10 can be adjusted by using a pulsed gas inlet valve. Col. 33, line 13-39.

10. Regarding claims 4-6, 24, and 27, Whitehouse teaches varying the timing and application of voltages to the electrodes, which is controlled by the configuration of power supplies, switches and controllers, and providing adjustable RF and DC power supplies. Col. 23, line 29-46; and Col. 24, line 6-18.

11. Regarding claims 7 and 8, Whitehouse teaches as described above in Figure 1C that, the particles oscillate inside the potential well the ions, and are constrained

(guided) and accumulated (trapped) over time prior to acceleration into the Time-Of-Flight tube for mass analysis. Also see Abstract.

12. Regarding claims 17-19, 21, 22, and 24-29, Whitehouse teaches manipulating particles by varying trapping regions due to application of voltages selectively to individual segments of the array, where manipulating includes moving particles perpendicularly in the potential well, and moving particles (distinguishing) in proportion to their m/z value. Col. 9, line 60-66; and Col. 11, line 45-55.

13. Regarding claims 41-43, 45-48, Whitehouse teaches planar electrode 13 (note Figure 1A above) forms the boundary opposite pusher electrode 11 of pulsing region 10, which contains an aperture or hole for extracting (moving) ions into the TOF drift region. Col. 17, line 18-51.

14. Regarding claims 49-56, 65-70, 75-77, 80-87, 89-91, and 93-96, Whitehouse teaches the apparatus used in these method claims as described above regarding claims 1-8, 17-22, 24-29, 41-43, and 45-48.

Claims Rejection – 35 U.S.C. 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,683,301 to Whitehouse.

17. Regarding claim 16, Whitehouse teaches all the required limitations therein, as pointed out above regarding claim 1, but fails to teach the frequency of alternating current voltage applied to the circular electrode is of a frequency having a period that is less than the time taken for light to pass over the diameter of the circular electrode.

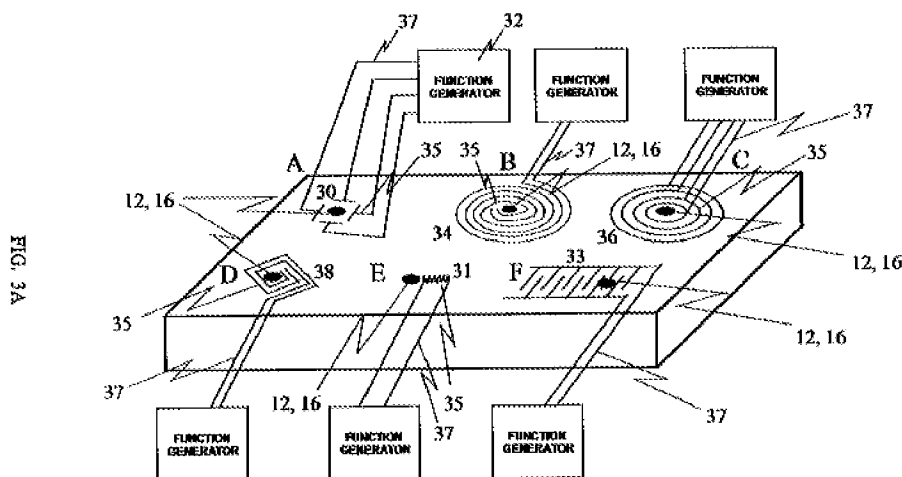
However, page 16 of the applicants remarks filed 11-26-2007 states; "Those skilled in the art, for any given size of circular electrode, could determine, such as by calculating, the time taken for the light to pass over the electrode. It should be apparent that the time would necessarily change as a function of the diameter of the electrode. In this manner, the limitation simply recites that the period of the voltage is less than the time taken by light to pass over the diameter of the electrode. In other words, those skilled in the art, after determining the time taken for a light beam to travel a particular diameter of a circular electrode, would correspondingly vary the voltage to have a period less than this time.

The examiner has interpreted from the remarks above that, it is well known in the art to calculate the time taken for light to pass over a circular electrode by dividing the diameter of the electrode by the velocity of light. Therefore it would have been obvious to one of ordinary skill in the art that Whitehouse would vary the frequency of the AC voltage so that its period is less than the time taken for light to pass over the diameter of the circular electrode in order to control the efficiency with which ions are trapped above the electrode surface.

18. Claims 23, 30-40, 44, 71-74, 78, 79, 88, and 92 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,683,301 to Whitehouse, in view of Wang, U.S. Patent Pub. No 20020182627.

19. Regarding claims 23, 30, and 32-39, Whitehouse teaches all the required limitations therein, as pointed out above regarding claim 1, but fails to teach the use of plural concentric circular electrodes having an aperture.

20. Wang teaches a quadrupole electrode structure (note Figure 3A -3C below) wherein FIG. 3B depicts a spiral electrode structure 34, circular in nature, that is useful for positioning particles 35 at or near a hole 12, 16 (aperture) and FIG. 3C depicts a concentric electrode structure 36, circular in nature, that is useful for positioning particles 35 at or near a hole 12, 16 wherein the depicted electrical connection leads 37 are operably engaged with an electrical signal source 32. See [0037] to [0041].



21. Wang modifies Whitehouse to provide particle positioning means where electrical connection leads (37) are operably connected with an electrical signal source

(32), such as a sine wave generator, to allow modulation of current at the electrode structures to allow positioning of particles.

22. Therefore it would have been obvious to one of ordinary skill in the art that the alignment apparatus and process of Whitehouse can be modified to use the electrode structures of Wang, to provide miniaturized devices for modulating ion transport functions or properties.

23. Regarding claims 31, 40, and 44, Whitehouse teaches using plural pumping stages 3, 4, 5, and 6 in series producing differential pressures at orifices 38, 43, and 44 (Note Figure 1D below), however the combination of Whitehouse and Wang fails to teach supersonic expansion through the apertures to cool the ions. However, it is well

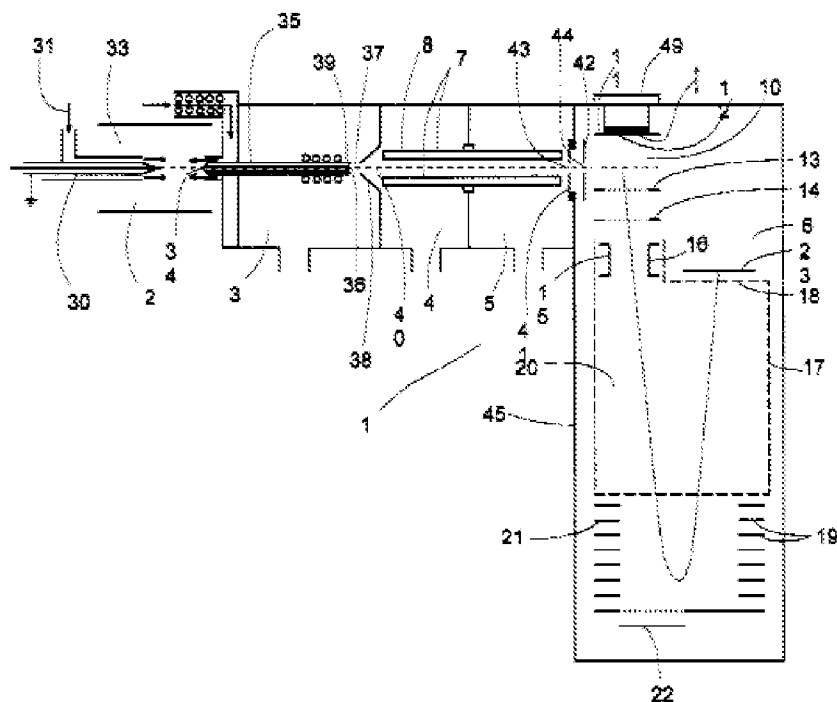


Figure 1D

known in the art that the differential pressure on each side of an aperture produces supersonic flow resulting in adiabatic cooling of ions. (See USPN 5,015,845 to Allen). Therefore it would have been obvious for Whitehouse and Wang to select an extraction aperture size to provide cooling of particles to reduce the ion kinetic energy distribution and spatial spread thereby providing higher resolving power and mass accuracy in Time-Of-Flight mass to charge analysis.

24. Regarding claims 71-74, 78, 79, 88, and 92, the combination of Whitehouse and Wang discloses the apparatus used in these method claims as described above regarding claims 16, 23, 30-40, 44, and 49.

Conclusion

25. The Amendment filed on 11-26-2007 has been considered but the arguments are moot in view of new grounds for rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

26. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim can be reached at (571) 272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ
February 8, 2008

/ROBERT KIM/

Supervisory Patent Examiner, Art Unit 2881